

# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE May 30, 1980

SUBJECT IPP Fugitive Emissions Annual Impact Analysis

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JUN 17 1980

CFPO

Technical Support Section -- 8AH-A

TO IPP Files

During the reopened public comment period beginning March 27, 1980, the Utah State Department of Health raised three basic concerns (letter Keller to Rickers, April 3, 1980) about the proposed PSD permit for the IPP Generating Station.

First, insufficient engineering details had been provided by the Company to adequately characterize emission rates from the various fugitive sources.

Subsequently, such details on emission rates were provided by Stearns-Roger, engineering consultant to the Company (letter, Packnett to Huey, April 24, 1980). These data were reviewed by EPA and compared to PEDCO emission estimates (report, October 25, 1979) whereupon EPA selected the most representative emission rates for each fugitive source (memo, Dale to the File, May 21, 1980).

Stack emissions did not show this.

Second, modeling of the fugitive and tall stack emissions by the State showed exceedences of the annual Class II increments for particulates and of the secondary NAAQS for particulates off of but near Company property.

Per the preferred emission rates selected by EPA as mentioned above, each source contribution was recomputed and the final concentration at each receptor on the Utah Valley model output was scaled by a factor of 0.3572. Table 1 shows the emission and source contribution data. The scaling factor was obtained by dividing column 6 (EPA source contributions) by column 5 (Utah model source contributions) on table 1. The resulting scaled ground level concentrations are shown in figure 1. On that figure, isopleth outlines the area in which the annual Class II particulate increment is exceeded. This isopleth extends off plant property (solid line redrawn from engineering diagrams) by a distance of no greater than about 400 m. Adding the routinely expected background concentration for this area, 24  $\mu\text{g}/\text{m}^3$ , to the highest scaled interpolated concentration off plant property, also about 24  $\mu\text{g}/\text{m}^3$ , yields a total concentration off plant property of near 48  $\mu\text{g}/\text{m}^3$ . Thus, the annual secondary NAAQS for particulates of 60  $\mu\text{g}/\text{M}_3$  is not threatened.

The Valley Model makes the assumption that all particulate emissions behave as a gas, that is none of the particles are assumed to be influenced by gravity. Therefore, EPA undertook an investigation of particle size frequency distribution of coal dust to determine if any of the IPP particulate emissions might be deposited before leaving plant property.

CFPO	
DIST	CCAT
IPP BRD	
IPA BRD	
JHA	
ATO	
JCF	
CDH	
HLH	
MMH	
FK	
HML	
JLS	
THM	
RNV	
VLP	
GRS	
RDS	
BMT	
JWP	
FILE	
PER JHA	

A 1978 PEDCo publication, "The Survey of Fugitive Dust from Coal Mines," provides a composite size distribution of particles from coal storage areas. From that publication a size distribution was obtained for the dust emitted from the storage areas and the coal conveying and transferring operations. (See table 2.)

The mass mean diameter was calculated for each category using the equation:

$$\bar{d} = \frac{d_2^3 + d_2^2 d_1 + d_2 d_1^2 + d_1^3}{4}^{1/3}$$

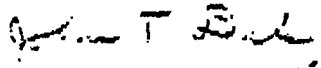
Each particle was assumed to settle according to Stokes Law given as

$$V_g = \frac{2r^2 g_0}{9\mu}$$

The distances to where all the particles in a size category reach the ground is listed in table 2. The maximum concentration predicted by the Valley model at the plant property boundary on the north is interpolated to be 21.1  $\mu\text{gm}/\text{m}^3$  and on the south to be 24.0  $\mu\text{gm}/\text{m}^3$ .

The coal piles are between 850 and 1,160 meters from the north boundary and 1,980 meters from the south boundary. The conveying and transfer operations are about 1,190 meters from the north boundary and between 1,490 and 1,740 meters from the south boundary. From table 2, 19 percent of the coal pile emissions will fall out prior to reaching the north boundary and 47 percent prior to reaching the south boundary. Twenty-five percent of the coal conveying and transfer emissions will fall out prior to reaching the north boundary or south boundary. The maximum concentrations, taking into account deposition of the larger coal particles, was determined to be 18.6  $\mu\text{gm}/\text{m}^3$  at the north property line and 18.0 at the south property line (see table 3).

The allowable Class II increment is 19  $\mu\text{gm}/\text{m}^3$ .

  
Richard W. Fisher  
Meteorologist

**Table 1 - Emissions and Source Contributions for the TPP Generating Station**  
Prepared by Utah Department of Health and EPA, Region VIII

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Source	Utah Modeled Emission Rate tons/yr	Revised EPA Emission Rate tons/yr	Ratio (Col. 3/Col. 2)	Source Contributions Utah Model {ugm/m <sup>3</sup> }	Source Contributions EPA Model (Col. 4 x Col. 5)
Stack 1 and 2	2,137.0	2,137.0	1.00	.002971	0
Coal unloading and crushing	30.9	3.0 4.5 1.5	0.15	7.90	1.15
Coal conveying and transfer	8.0	25.0 30.9 5.9	3.86	0.69	2.67
Coal storage	195.0	120.8	0.62	17.84	11.05
Ash silo vents	568.0	- 0 -	- 0 -	30.27	- 0 -
Ash silo unloading	94.0	94.0	1.00	8.39	8.39
Total	3,032.9	2,387.2	--	65.10	23.26

Table 2 - Deposition Calculations

Particle Size Categories ( $\mu\text{m}$ )	Category Frequencies %	Mass Mean Diameter $d(\mu\text{m})$	Radius $r(\mu\text{m})$	Settling Velocity (Stokes Law) $V_g(\text{m/s})$	Distance Downwind to Settling $X(\text{m})$
1 - 10	13%	6.3	3.15	0.2	27,300
11 - 20	40%	15.9	7.95	1.1	4,963
21 - 30	22%	25.8	12.90	3.0	1,820
31 - 35	6%	33.0	16.50	4.9	1,114
36 - 40	12%	38.0	19.00	6.4	853
41 - 50	7%	45.6	22.80	9.3	587

Table 3 - Interpolated Maximum  
Concentrations at Plant Boundary

	Source Contributions at North Boundary	Source Contributions at South Boundary	Source Contributions Including Deposition at North Boundary	Source Contributions Including Deposition at South Boundary
Stack 1 & 2	0	0		
Coal unload & crush	1.04	1.19	1.04	1.19
Coal conveying & transfer	2.42	2.76	1.82	2.07
Coal storage	10.02	11.40	8.12	6.04
Ash silo vents	0	0	0	0
Ash silo unloading	7.61	8.66	7.61	8.66
Total	21.1	24.0	18.6	18.0

